

JPEG2000 Parsing/Repackaging Examples

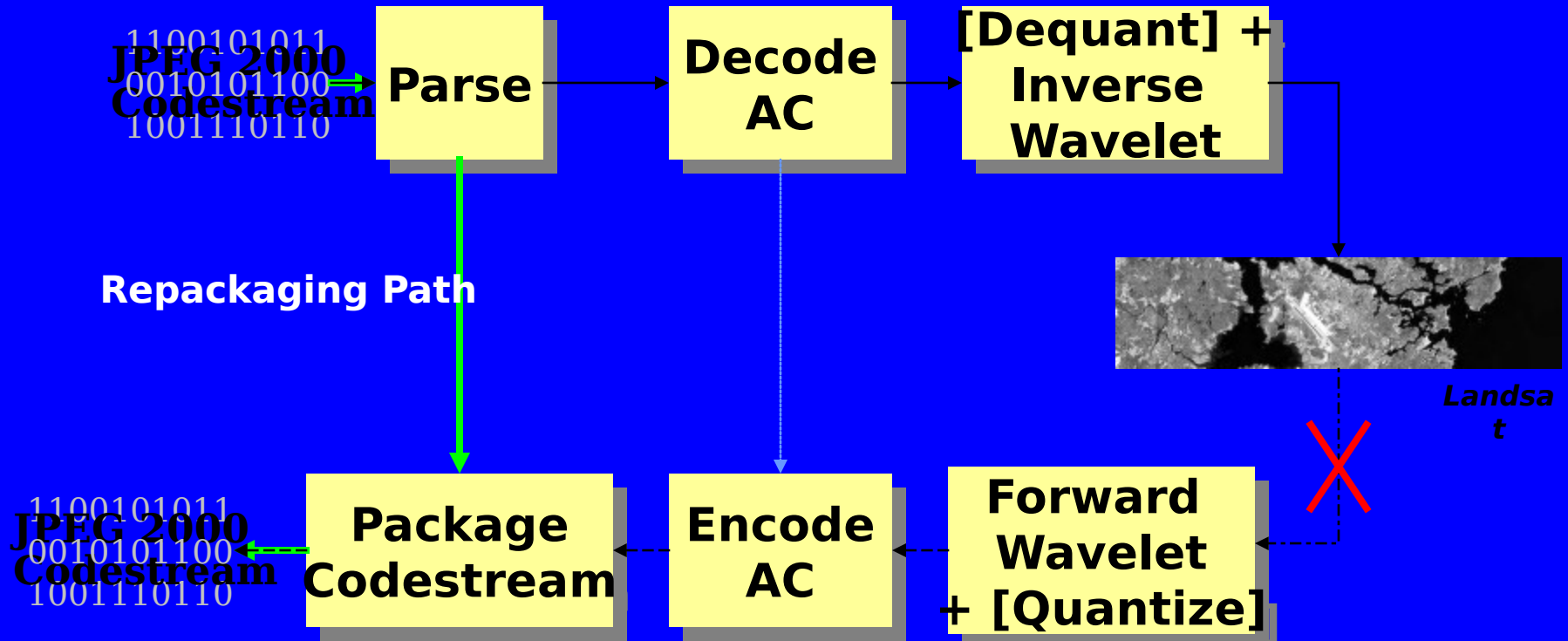
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15 May 2002

Overview

- **Impact of NSGI preferred format on parsing / repackaging implementations**
- **Processes examined**
 - **Spatial restriction**
 - **Rate control**
 - **Resolution reduction**
 - **Releasability**
 - **Component restriction**
 - **Layer restriction**
 - **Partial tile expansion via codeblock parsing**
- **J2K codestreams tested without NITF file format**

Parsing and Repackaging (Life after Compression)



Expand = Parse + Decompress
Repackage = Parse + Package

NSGI Parsing

Standard J2K convention

- Tile parsing
- Layer parsing
- Resolution parsing
- Component parsing

- Codeblock parsing
 - for partial region expand

Non-standard

- Rate control

NSGI Repackaging

Standard J2K convention

- Tile parsing / renumbering
- Layer parsing
- Resolution parsing
- Component parsing

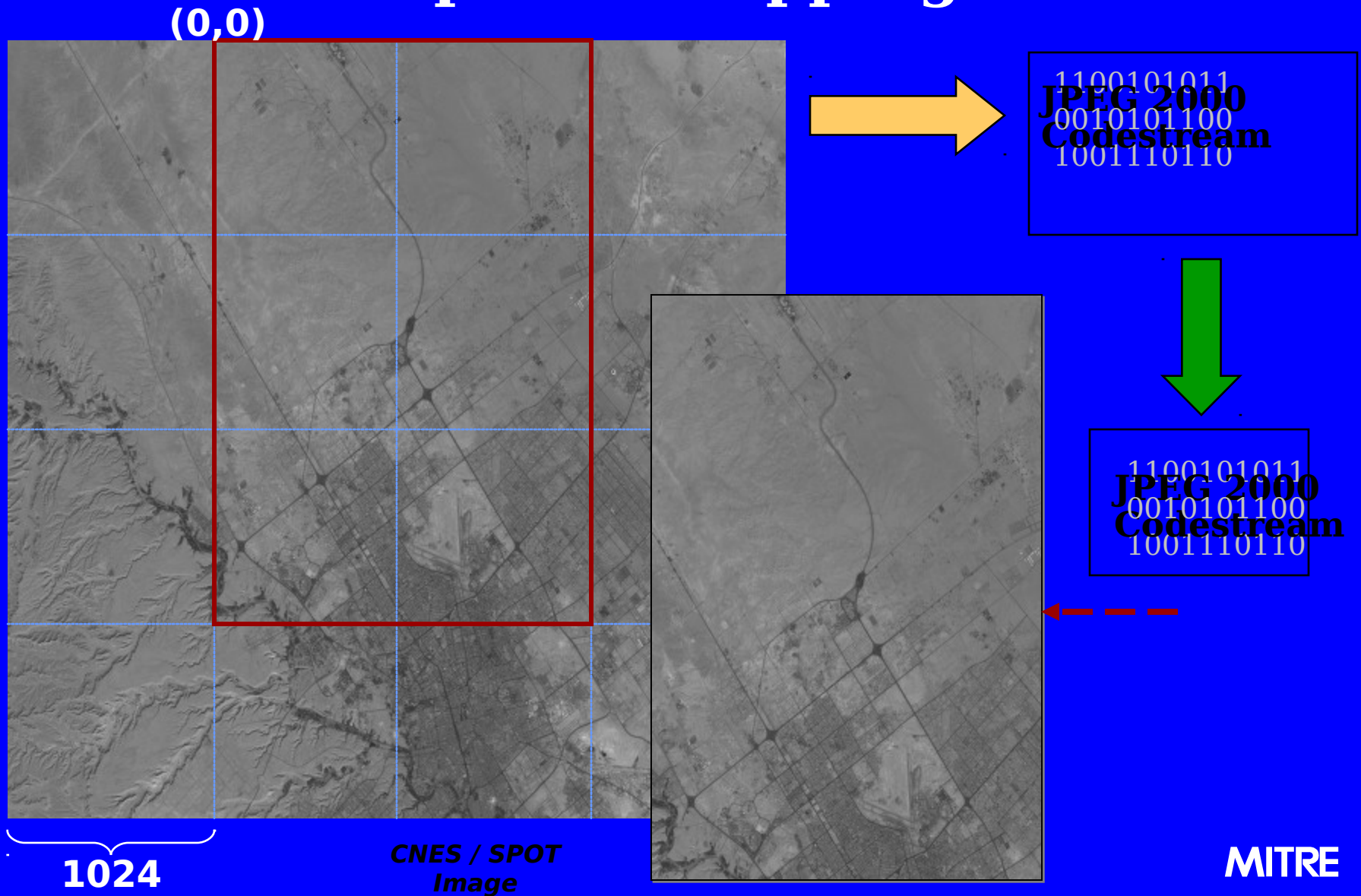
- COD modification
- QCD modification
- SIZ modification for resolution

Non-standard

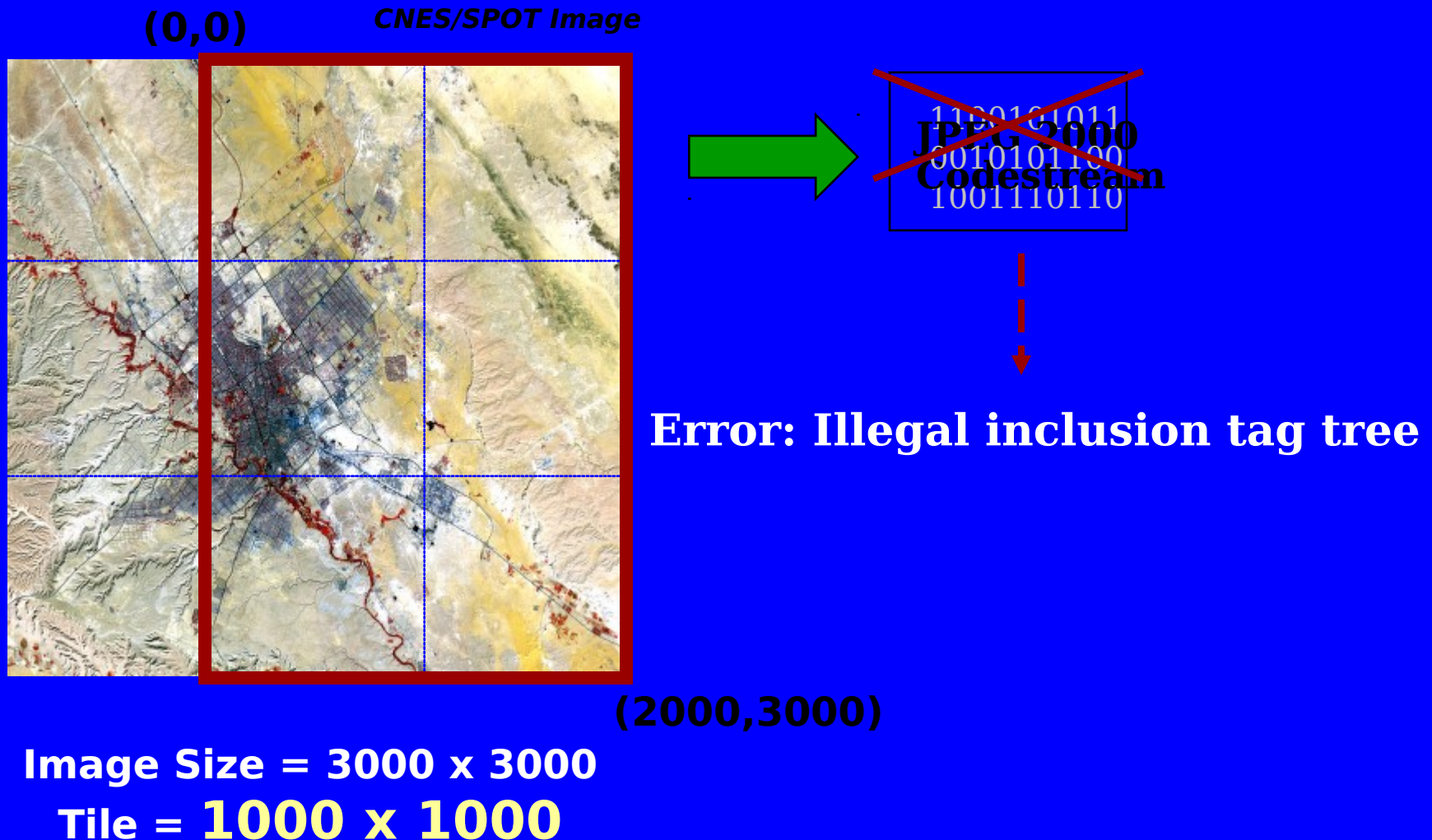
- SIZ modification for chipping
 - Image/Tile offset = 0
 - *(if tile correctly sized)*
- Rate control

- Graying Out tile
- TLM inclusion
- PLT inclusion
- PLT formatting by layer

Spatial Chipping

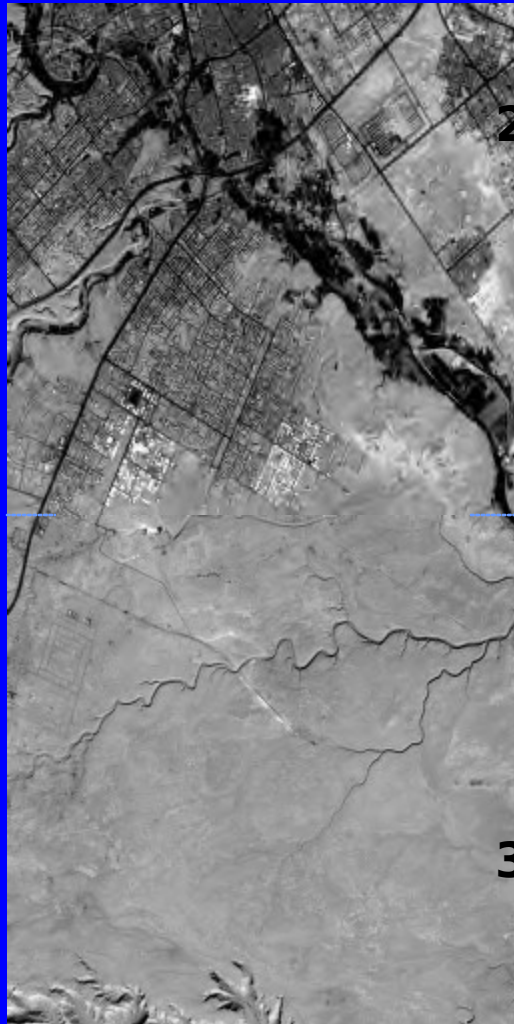


TileSize Impact on SIZ Update in Chipping



Rate Control: per Tile

1.5 bpp



2.x layers



<1 packet



1 packet

(3.9 bpp at R5)

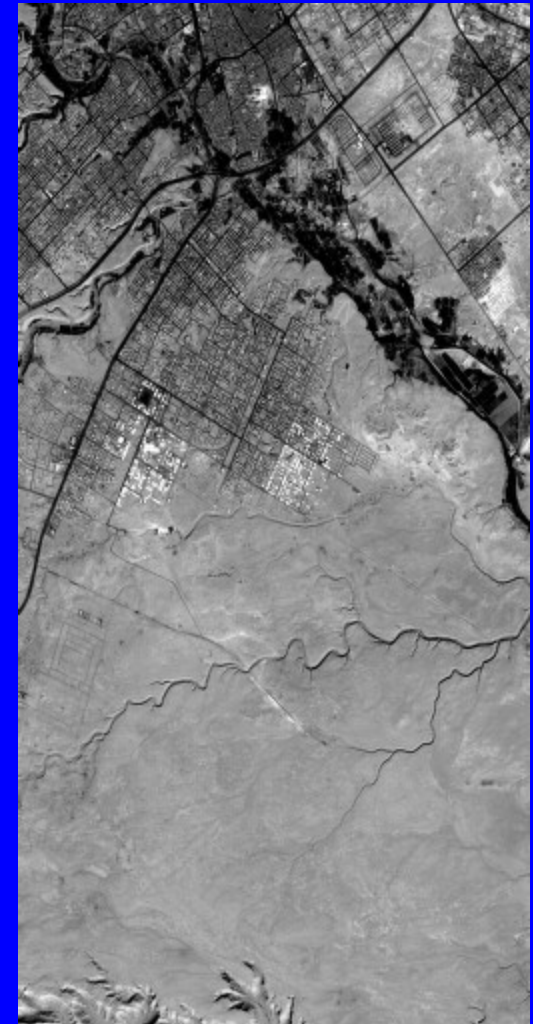
**Always include
at least one packet!**

3.x layers

*CNES/SPOT
Image*

4 Layers total

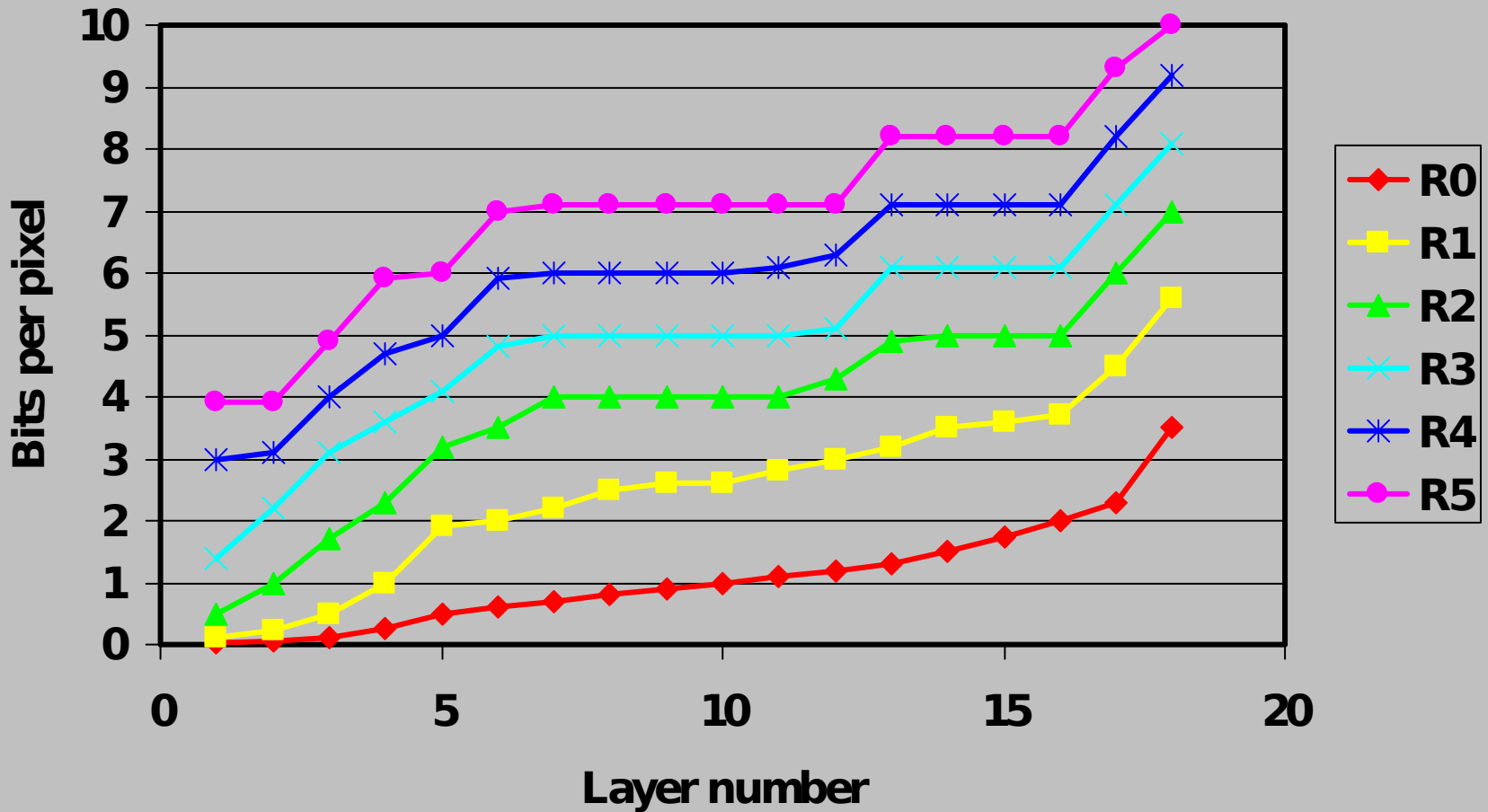
R2



*CNES/SPOT
Image*

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BitRate vs Resolution (varies by tile for R1-R5)



Quality Reduction

- **R0 to bitrate**

- with J2K TRE **No rate control; use layer mapping**
- w/o J2K TRE **Rate control**

- **R1 - R5 to bitrate**

- **Rate control**

- **Basic rules**

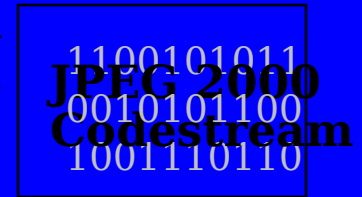
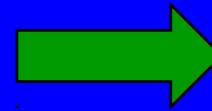
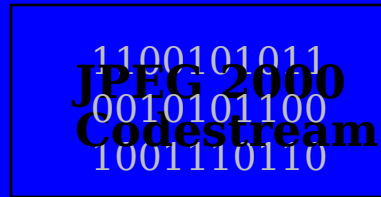
- **replace rate control by layer parsing whenever possible**
- **at least one packet must remain in every tile**
- **don't include more than 4.3 bpps [Or possibly lower]**

Releasability

Space Imaging



Find non-releasable tiles



Remove all packets in chosen tiles



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Component Selection

TM Bands

3,2,1

JPEG 2000
Codestream

1100101011
0010101100
1001110110

JPEG 2000
Codestream

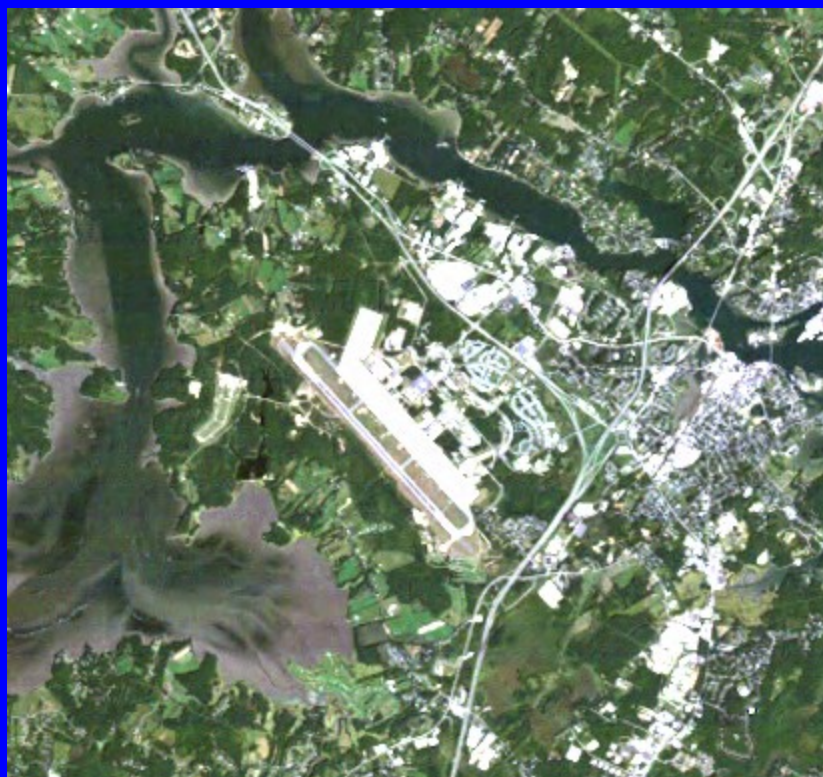
6 bands

TM

TM Bands

5,4,3

JPEG 2000
Codestream



Landsat
TM

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Layer Parsing

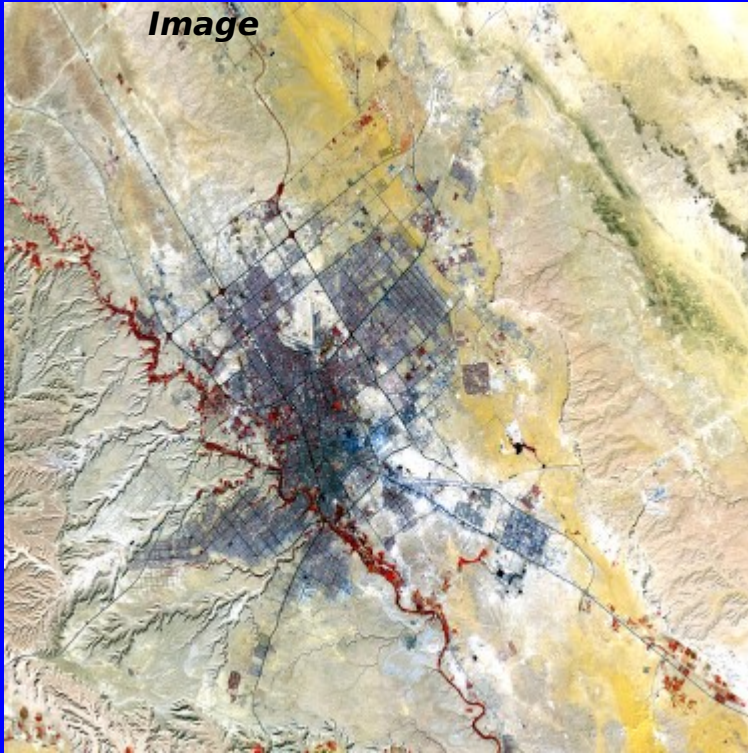


CNES/SPOT Image

Bpp: 0.125 → 0.25 → 0.5 → 1.0
Layers: 3 → 4 → 5 → 10

Varying Resolution / Spatial Extent via Codeblock Parsing

**CNES/ SPOT
Image**



**R3
9 full tiles**

**CNES/ SPOT
Image**



**R2
4 partial tiles**



**R0
1 partial tile**

Decode faster than full tiles

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Areas not yet Examined

- **Chipping at non-tile boundaries**
 - Image offsets > 0
 - Recompression at borders
- **Error resilience**
 - Format recommendations
- **Very low bandwidth**
 - Recommendations re TLM / PLT
- ...